

RECEIVED  
CENTRAL FAX CENTER  
JAN 08 2007

REMARKS

The above amendments to Claims 11 and 22 serve to further define the presently claimed invention. More specifically, the pre-formed stabilizers of Claims 11 and 22 now require that the ethylenically unsaturated macromer be a monofunctional compound with respect to OH groups. In addition, Claims 11 and 22 have been amended to identify specific quantities of components (1), (2), (3) and (4) which are present relative to the total formulation of the pre-formed stabilizer. Support for these amendments to Claims 11 and 22 can be found in the present specification on page 27, lines 9-19. In this regard, Applicants direct the Examiner's attention to the incorporation by reference of U.S. Patent 5,196,476 into their specification. Support for the relative amounts of components (1), (2), (3) and (4) in amended Claims 11 and 22 is found in U.S. Patent 5,196,476 at column 15, lines 36-47, and specifically in the table set forth therein. It is readily apparent that component (A) of this formulation is the "precursor" which is a macromer and thus, corresponds to component (1) of the present formulation. Component (B) of the '476 patent is an ethylenically unsaturated monomer and thus, corresponds to component (2) of the present formulation. Component (C) of the '476 patent is a free-radical polymerization initiator and therefore, corresponds to component (3) in Claims 11 and 22. Finally component (D) of this reference is a liquid diluent and therefore, corresponds to component (4) of the present invention. These components (A), (B), (C) and (D) are further described in U.S. Patent 5,196,476 at column 13, lines 43-53.

Claims 12 and 23 have also been amended to further define the invention therein. Specifically, the claimed pre-formed stabilizers therein now require that the ethylenically unsaturated macromer be a monofunctional compound with respect to OH groups.

Finally, Claims 17 and 28 have been cancelled in view of the amendments to Claims 11 and 22, respectively.

In view of the preceding amendments, Claims 11-16, 19-27 and 29-31 are pending. Claims 1-10 and 32-53 have been withdrawn from consideration in view of a restriction requirement under 35 U.S.C. § 121.

Applicants respectfully submit that no new matter has been added by the preceding amendments.

Claims 11-17 and 19-31 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

This rejection is moot in view of the preceding amendments to Claims 11 and 22.

Claims 11-17, 19 and 22-29 were rejected under 35 U.S.C. § 102(b) as being anticipated by the Preston et al reference (U.S. Patent 4,202,947), the Preston et al reference (U.S. Patent 4,186,271), or the Yu reference (U.S. Patent 4,680,358).

The Preston et al reference (U.S. Patent 4,202,947) discloses the preparation of graft copolymers by reacting certain alkenyl aryl polyols having from 2 to 5 hydroxyl groups with ethylenically unsaturated monomers. The alkenyl aryl polyols used as reactants correspond to one of three formulas as specified at column 2, lines 10-29; column 2, lines 38-54; and column 3, lines 3-14. These graft polymers are prepared by reacting an alkenyl aryl polyols with one or more unsaturated monomers, optionally in the presence of an additional base polyol, to form the graft polymers therein. See column 4, lines 60-68.

Unsaturated polyols containing alkenyl aryl constituents are disclosed by the Preston et al reference (U.S. Patent 4,186,271). These unsaturated polyols are prepared by reacting a polyol with an aromatic derivative which contains both an alkenyl constituent and a second functionality that is reactive with a polyol. The alkenyl aryl polyols of this reference contain from 2 to 5 hydroxyl groups, and correspond to the formula set forth at column 2, lines 45-66. These alkenyl aryl polyols can be used to prepared graft copolymers as is described in the '947 patent. The '271 and the '947 patents are not related in the sense of belonging to the same patent family. However, the products described and claimed in the '271 patent are suitable reactants for forming the graft copolymers in the '947 patent.

The Yu reference (U.S. Patent 4,680,358) discloses styryl terminated macromolecular monomers of polyethers. This reference is discussed on page 6, lines 1-9 of the present application. These styryl terminated macromolecular monomers of polyethers are prepared by polymerizing (A) a cationically ring-

PO-7934

openable cyclic ether selected from alkylene oxides and glycidyl ethers (see structures I and II at column 3, lines 34 through 65), and (B) a monoolefinically (i.e. styrylically) unsaturated primary or secondary alcohol which corresponds to structure III (see column 4, lines 1-20), in the presence of (C) a cationic initiator. The resultant macromers have the structure R-(M)<sub>m</sub> - OH, in which R represents the residue of the styrylically unsaturated alcohol, M represents the residue of at least one cyclic ether which is ring-opened, and m represents an integer in the range of from 2 to 500. It is also disclosed that macromer block copolyethers can be prepared by polymerizing plural cyclic ethers sequentially, or by using a macromer as a propagator to yield compositions of structure V (column 4, lines 41-48); and random copolymers of these macromers by polymerizing macromers of structure IV or V with an olefinically unsaturated monomer to yield compositions of structure VI<sub>a</sub> or VI<sub>b</sub> (see column 4, lines 49-68).

It is respectfully submitted that these rejections are moot in view of the preceding amendments to Claims 11 and 22. It is readily apparent that component (1), i.e. the ethylenically unsaturated macromer, required by Applicants' claims is always monofunctional, i.e. these only contain one OH group. This is evident in light of the amendment that "m" must now equal 1 in these ethylenically unsaturated macromers.

Both of the Preston et al references (U.S. Patents 4,186,271 and 4,202,947) disclose alkenyl aryl polyols which have from 2 to 5 hydroxyl groups. See column 2, lines 45-66 of the '271 patent and column 2, lines 7-28 of the '947 patent. These di- and higher functional alkenyl aryl polyols of the Preston et al references do not anticipate the ethylenically unsaturated macromers of the presently claimed invention which are always monofunctional. Applicants therefore submit that this rejection is improper and request that it be withdrawn.

The Yu reference describes macromers and the preparation of macromer block copolymers and random copolymers from these macromers. Applicants respectfully submit that these are clearly not pre-formed stabilizers as required by the present claims.

Claims 11 and 22 as amended now require specific ranges of components (1) the ethylenically unsaturated macromer, (2) the ethylenically unsaturated monomer, (3) the free-radical polymerization initiator, and (4) the liquid diluent. In particular, these are from 10 to 40% by wt. of component (1), from 10 to 30% by wt. of component (2), from 0.01 to 2% by wt. of component (3), and from 30 to 80% by wt. of component (4). This is not disclosed or suggested by the Yu reference.

Example 2 is the only portion of the Yu reference that provides any detail into the use of these homomacromers as dispersants for polymerization of acrylic acid (i.e. an unsaturated monomer). This example discloses reacting 115 g of acrylic acid (an ethylenically unsaturated monomer), 12 g of the PECH homomacromer from Example 1, 0.9 g of allyl pentaerythritol (a crosslinking agent), and 620 g of benzene (a solvent), in the presence of 0.14 g of lauroyl peroxide (a free radical initiator). In the same terms as the present invention, this uses about 1.6% of the macromer from Example 1 (i.e. PECH homomacromer), about 15.4% of ethylenically unsaturated monomer (i.e. acrylic acid), about 0.02% of free-radical initiator, and about 82.9% of solvent. Thus, it is evident that the quantity of macromer used in the Yu reference is much smaller than the quantity of ethylenically unsaturated macromers required by the present claims. In fact, the presently claimed invention requires that the ethylenically unsaturated macromers be used in an amount of from more than 6 (i.e. 6.25) times higher to up to 25 times higher than the quantity used in the Yu reference. Thus, the Yu reference does not properly anticipate the presently claimed invention. Applicants submit that this rejection is also in error and request that it be withdrawn.

Claims 11-17, 19 and 22-29 were rejected under 35 U.S.C. § 102(b) as being anticipated by the Hoffman reference (WO 87/03886).

The Hoffman reference discloses a process for preparing polymer polyols which comprises (a) forming a dispersant by homopolymerizing a vinyl-terminated adduct or copolymerizing the adduct with at least one ethylenically unsaturated monomer in the presence of an active hydrogen compound as a solvent in conditions such that the dispersant has a Brookfield viscosity of less than 25,000 cps (at 25°C) as a 20-35 wt.% solution of the polymer of the vinyl-terminated adduct in an active

PO-7934

- 21 -

hydrogen-containing compound, and (b) polymerizing an ethylenically unsaturated monomer or mixture thereof, in the presence of the dispersant and a base polyol under conditions such that the polymerized monomer forms a plurality of particles which are stabilized against agglomeration by the dispersant.

It is respectfully submitted that the dispersants formed in step (a) of this process do not properly anticipate the pre-formed stabilizers of Applicants' claimed invention. The vinyl-terminated adducts of the Hoffman reference are polymers which have a molecular weight of at least 200, preferably 300 to 8000, and contain ethylenic unsaturation. These are more preferably polymers of PO and/or EO having a hydroxyl functionality of 0 to 3, and containing 1 vinyl group per molecule (page 5, line 37 through page 7, line 2). The vinyl-terminated adducts are homopolymerized or copolymerized with an ethylenically unsaturated monomer to form a dispersant (i.e. a macromer) which is suitable for the preparation of polymer polyols. See page 10, lines 1-31.

More specifically, these adducts of the reference are the reaction product of a monol or polyol and a difunctional material which contains both ethylenic unsaturation and a group which reacts with an active hydrogen-containing group to form a bond. Specific examples of such difunctional materials which contain both ethylenic unsaturation and a group reactive with an active hydrogen-containing group include compounds such as, for example, ethylenically unsaturated isocyanates, acid anhydrides, acid halides and esters. Preferred unsaturated isocyanates are isocyanatoethylmethacrylate (IEM), and (1,1-dimethyl-1-isocyanatomethyl)-isopropenylbenzene (TMI) (see page 7, lines 4-19). All of the examples of this reference use a vinyl-terminated adduct, i.e. a macromer, prepared from isocyanatoethyl methacrylate (IEM).

Applicants respectfully submit that the working examples of this reference make it readily apparent that dispersants (i.e. macromers) prepared from these vinyl-terminated adducts based on IEM (isocyanatoethyl methacrylate) require that only a small quantity of a polyol or other such material be present. These polyols correspond most closely to the liquid diluents (4) in the present invention. In particular, the dispersant prepared in Example 1B only uses about 8% of Polyol A; that in Example 2B only uses about 18% of a high MW triol; Examples 3-5 also use PO-7934

about 18% of a high MW triol; Example 10B uses about 7.5% of Polyol B; and Example 11B uses about 18% of Polyol C. By comparison, the liquid diluent of the present invention must be present in a much higher quantity. In particular, the present invention requires at least 30% by wt. and permits as much as 80% by wt. of the total formulation to be liquid diluent.

Furthermore, the presently claimed invention requires that the ethylenically unsaturated macromer (i.e. component (1) of Claims 11 and 22) be present in an amount of from 10 to 40% by wt., based on 100% by wt. of the pre-formed stabilizer formulation. By comparison, the dispersant in Example 1B of the Hoffman reference contains more than 89% by wt. of the adduct (i.e. ethylenically unsaturated macromer) from Example 1A. The dispersant in Example 2B contains about 78% by wt. of the adduct from Example 2A; and the dispersants in Examples 3-5 also contain about 78% by wt. of the respective adducts. Example 7 is similar to Example 1b and thus, contains about 89% of the ethylenically unsaturated adduct. The dispersant of Example 8 is similar to Example 2B and thus contains about 78% of the ethylenically unsaturated adduct. Example 10B prepares a dispersant which contains about 82% of the ethylenically unsaturated adduct; and Example 11B prepares one which contains about 80% of the ethylenically unsaturated adduct. It is evident from this that the Hoffman et al reference does not disclose pre-formed stabilizers as required by the present claim language in which an ethylenically unsaturated macromer is present in an amount of from 10 to 40% by wt. By comparison, all of the examples of this reference use almost two times as much ethylenically unsaturated adduct as permitted by Applicants' claims. Accordingly, the presently claimed invention is not properly rejected as being anticipated by the Hoffman reference. Applicants submit that this rejection is clearly improper and request that it be withdrawn.

Claims 11-17, 19, 21, 22-29 and 31 were rejected under 35 U.S.C. § 102(b) as being anticipated by the Holeschovsky et al reference (U.S. Patent 6,013,731).

The Holeschovsky et al reference is discussed in the background of the present application at page 3, lines 18-21 and at page 4, lines 12-21. Applicants respectfully submit that of the references relied on by the Examiner in the rejections

PO-7934

in the final Office Action dated November 8, 2006, this is the only one which discloses and/or describes pre-formed stabilizers as defined in the present application. Applicants submit, however, that these are different than those of the presently claimed invention in view of the different stabilizer precursors used therein.

The Holeschovsky et al reference discloses stabilizer precursors and pre-formed stabilizers which have induced unsaturation and are prepared from these precursors. The stabilizer precursors are commonly referred to as macromers or macromonomers (see column 4, lines 52-55), and may be used directly in the production of polymer polyols (column 7, lines 8-17). Stabilizer precursors may also be used in the preparation of pre-formed stabilizers. The pre-formed stabilizers of this reference are prepared by polymerizing vinyl monomers *in situ* in the stabilizer precursor, optionally in the presence of a polyol or low molecular weight diluent, thus forming a fine dispersion of vinyl polymer particles at relatively low solids content (column 7, lines 18-24).

Stabilizer precursors of this Holeschovsky et al reference are prepared from polyoxyalkylene polyols modified to contain induced ethylenic unsaturation, with the polyols initially having low levels of intrinsic unsaturation and a nominal functionality of 1 or more. The precursors are prepared by reacting a polyoxyalkylene polyol which contains low intrinsic unsaturation with a suitable compound to introduce the induced unsaturation into the product. Thus, these stabilizer precursors are typically di- and higher functional materials.

Accordingly, although the Holeschovsky et al reference discloses both preformed stabilizers and a process for their production which is similar to that required by the present claims, these differ from the presently claimed invention in the number of hydroxyl groups present. The macromers of the present invention are always monofunctional hydroxyl compounds and always contain a vinyl benzene group. Such ethylenically unsaturated macromers are not disclosed by the Holeschovsky et al reference.

Accordingly, the Holeschovsky et al reference does not properly anticipate the presently claimed invention. It is therefore submitted that this rejection is improper and Applicants request that it be withdrawn.

Claims 20, 21, 30 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Hoffman reference (WO 87/03886) in view of the Holeschovsky et al reference (U.S. Patent 6,013,731).

Applicants additionally submit that combining the Hoffman reference (WO 87/03886) and the Holeschovsky et al reference (U.S. 6,013,731) does not render any of Claims 11-31 (including Claims 20, 21, 30 and 31) unpatentable under 35 U.S.C. § 103(a).

Claims 20, 21, 30 and 31 of the present application are specifically directed to the diluent used to prepare the claimed pre-formed stabilizers. In particular, the diluent is specifically either a monohydroxyl alcohol as in Claims 20 and 30, or a poly(oxypropyleneoxyethylene)polyol having an oxyethylene content of less than about 50% by weight and containing low unsaturation as in Claims 21 and 31.

As previously discussed by Applicants, the presently claimed pre-formed stabilizers and process for their preparation are not described by the Hoffman reference. Nor does the Holeschovsky et al reference disclose the ethylenically unsaturated macromers which are monofunctional with respect to the number of hydroxyl groups present as are now required by the presently claimed invention. Thus, the disclosure by either Hoffman or Holeschovsky et al of diluents which overlap with the monohydroxyl alcohols of Claims 20 and 30 or the polyols of Claims 21 and 31, combined with the other reference does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

First, it is noted by Applicants that Claims 21 and 31 of the present application require a poly(oxypropyleneoxyethylene) polyol which contains low unsaturation. This type of unsaturation is clearly intrinsic unsaturation and would be clearly understood as such by one of ordinary skill in the art. The Holeschovsky et al reference describes both intrinsic unsaturation and induced unsaturation. See column 4, lines 31-44 and 56-61; column 5, lines 23-57; and column 6, lines 12-63. Intrinsic unsaturation is the level of unsaturation in a polyol which inevitably occurs due to rearrangement of reactant or product molecules to contain unsaturated sites (see column 5, lines 37-40). DMC catalysts are known to be able to produce polyols which have low intrinsic unsaturation (see column 5, lines 26-31). By comparison, induced unsaturation is unsaturation that is intentionally introduced into the

PO-7934

- 25 -

polyoxyalkylene polyether, and particularly those polyethers which are to be used in stabilizer precursors (see column 5, lines 46-50).

The Holeschovsky et al reference describes stabilizer precursors in which induced unsaturation (particularly from maleic anhydride or TMI) is added to a polyether polyol which has low intrinsic unsaturation. See column 6, line 46 through column 7, line 10. It further describes the use of these stabilizer precursors in the preparation of pre-formed stabilizers in the presence of a polyol or low molecular weight diluent such as isopropanol. See column 7, lines 17-24. These polyols are described therein as being conventional base-catalyzed polyols (column 7, lines 12-14). Accordingly, it is respectfully submitted that the low intrinsic unsaturation polyols of Claims 21 and 31 are not fairly suggested as suitable diluents by this reference.

The Hoffman reference is also silent in this regard.

Applicants therefore submit that this combination of references does not properly suggest the invention of Claims 21 and 31.

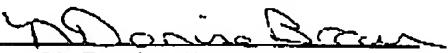
Finally, in light of the fact that neither the Hoffman reference or the Holeschovsky et al reference describes the presently required ethylenically unsaturated macromers which contain one hydroxyl group which are essential to the pre-formed stabilizers of the present invention, this combination of references can not properly render the presently claimed invention obvious to one of ordinary skill in the art. In the absence of a reference which describes the presently required macromers, it is respectfully submitted that these references do not render the presently claimed invention obvious to one of ordinary skill in the art.

Only after reading Applicants' specification does it become obvious to one skilled in the art as to which combination of components to select and the respective quantities of these components. Such a perspective does not, however, provide a proper basis for a rejection under 35 U.S.C. § 103(a).

Accordingly, the withdrawal of this rejection is respectfully requested.

In view of the preceding amendments and remarks, Applicants respectfully submit that each of these rejections is improper and request that they be withdrawn. The allowance of Claims 11-31 is respectfully requested.

Respectfully Submitted,

By   
N. Denise Brown  
Agent for Applicants  
Reg. No. 36,097

Bayer MaterialScience LLC  
100 Bayer Road  
Pittsburgh, PA 15205-9741  
(412) 777-3804  
FACSIMILE PHONE NUMBER  
(412) 777-3902

f:\shared\kp\l\dp\PO7934.ame

PO-7934

- 27 -